

FRANKLIN CLEANERS GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

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March 2013 through May 2013

CLIENT

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation

625 Broadway, 12th Floor, Albany, New York 12233

Site

NYSDEC Site No. 130050, Franklin Cleaners Site
Groundwater Extraction and Treatment System
Village of Rockville Centre, Town of Hempstead,
Nassau County, New York



Project Background and Site Description

The Franklin Cleaners groundwater extraction and treatment system (GWE&TS) is actively recovering and treating the “leading edge” of a chlorinated solvent-contaminated groundwater plume emanating from the former Franklin Cleaners dry cleaner site, located approximately one mile upgradient of the GWE&TS, in the Village of Hempstead, Nassau County, New York. The groundwater plume is primarily composed of tetrachloroethene (PCE). The Franklin Cleaners GWE&TS has been in operation since September 2004. Refer to [Figure 1](#) for a site location map depicting the treatment system location.

Groundwater Extraction and Treatment System Overview



The GWE&TS consists of two 6-inch diameter wells screened approximately 75 to 90 feet below grade. Extracted groundwater is conveyed via underground piping to a low-profile stacked-tray air stripper located in the GWE&TS building. The treated groundwater is discharged from the air stripper to a wet well equipped with two series-configured submersible pumps, which convey the treated water via underground piping to a Nassau County Department of Public Works storm sewer manhole in accordance with all applicable discharge standards. Exhaust gas from the air stripper was treated utilizing two series-configured granular activated carbon (GAC) vessels; however, based on historic low contaminant concentrations detected in the air stripper exhaust gas, the air stripper exhaust piping was reconfigured to bypass the GAC vessels

and discharge exhaust gas directly to the atmosphere in June 2011, per the direction of the NYSDEC. The GWE&TS is equipped with instrumentation and controls which allow for automated startup and operation, and an autodial alarm notification system. Refer to [Figure 2](#) for an “as-built” treatment system layout diagram.

Regulatory Requirements/Cleanup Goals

Site-specific remedial goals have been established through the remedy selection process as defined in 6 NYCRR Part 375-1.10, and are documented in the Record of Decision (ROD), dated March 1998. The site-specific remedial goals outlined in the March 1998 ROD are provided in [Attachment A](#). The overall goal is to meet all appropriate Standards, Criteria, and Guidance (SCGs) and to be protective of human health and the environment. Implementation of the GWE&TS is specifically focused on the following goals:

- Reduce, control, or eliminate contaminated media to the extent practicable;



- Eliminate the potential for exposure to contaminated groundwater; and
- Provide for attainment of SCGs for groundwater, soil and indoor air within the limits of the affected area, to the extent practical.

Treatment System Performance Summary

The GWE&TS performance during the current reporting period and since inception in September 2004 is summarized below:

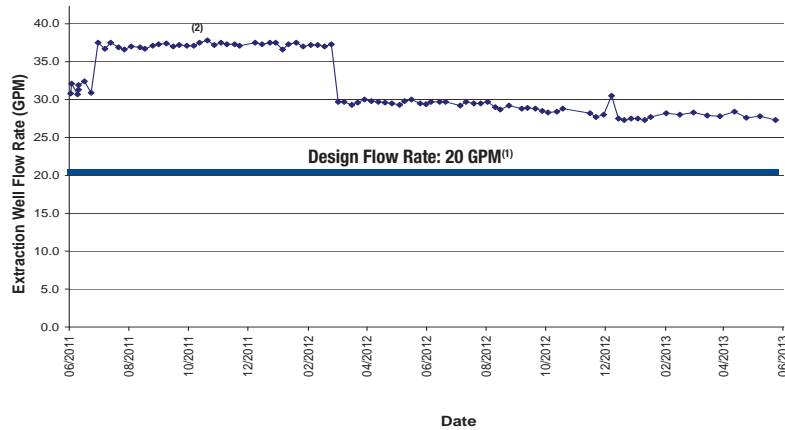
System Extraction Rates and Total Flow Volumes				
	EW-1	EW-2 ^(1,2)	System Influent	System Effluent ⁽²⁾
Average Pumping Rate - Current Reporting Period	27.9 gpm	6.4 gpm	34.3 gpm	43.8 gpm
Average Pumping Rate - Previous Reporting Period	27.9 gpm	6.3 gpm	34.2 gpm	44.1 gpm
Average Pumping Rate to Date	35.8 gpm	5.2 gpm	37.3 gpm	66.4 gpm
Total Flow Volume - Current Reporting Period	3,652,793 gal.	837,200 gal.	4,489,993 gal.	4,316,391 gal.
Total Flow Volume to Date	151,985,489 gal.	20,842,426 gal.	172,827,914 gal.	214,076,032 gal.

1. Extraction EW-2 flow meter consistently malfunctioned from approximately January 2010 to June 2011. Based on previously recorded flow data, it has been assumed that EW-2 was operating at an average flow rate of 7 gpm during this time period.

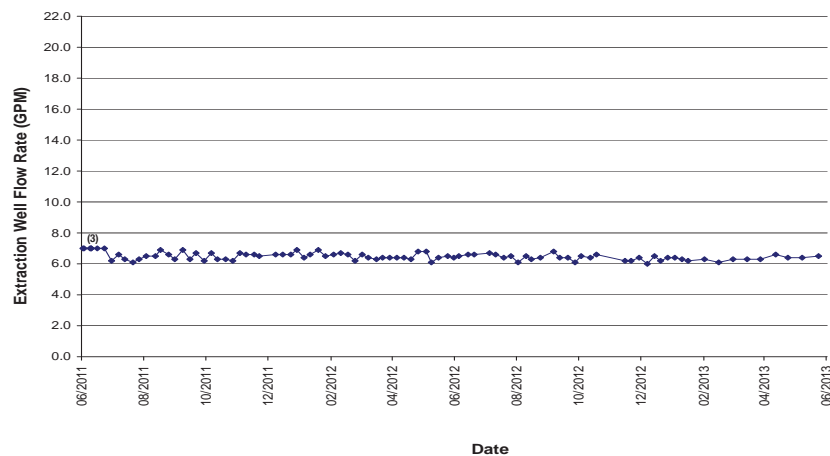
2. System influent and effluent pumping rates and volumes are monitored on a bi-weekly basis. Following replacement of the influent flow meters on June 23, 2011, total flow inconsistencies remained with respect to influent/effluent flow. As such, the effluent flow meter was replaced on May 2, 2012. Although the system influent and effluent flows are more consistent following the effluent meter change, system influent and effluent flows remain dissimilar.



Extraction Well EW-1 Flow Rate Trend Line



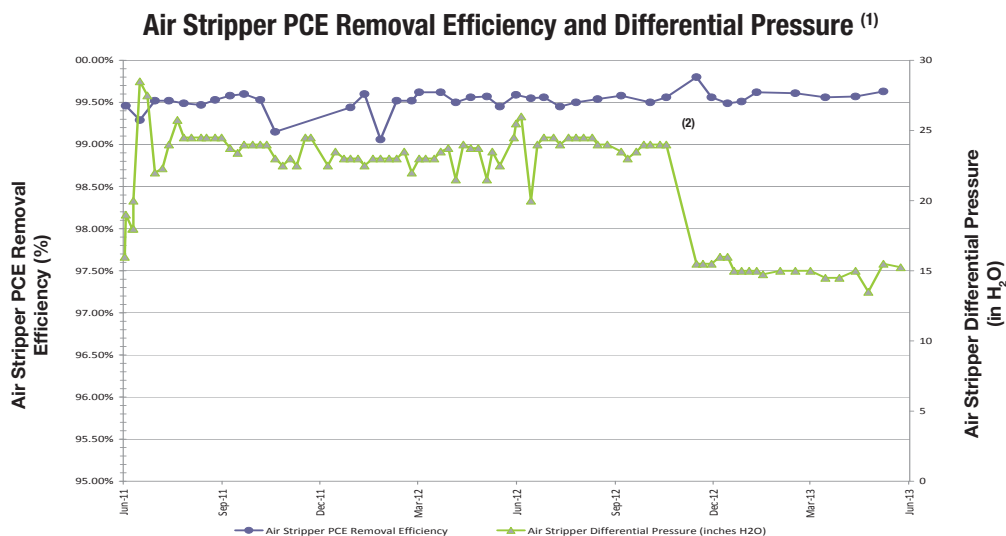
Extraction Well EW-2 Flow Rate Trend Line



1. Based on the results of capture zone design modeling, containment of the Franklin Cleaners chlorinated plume (at an approximate 450-foot width) would be achieved with the GWE&TS operating at a minimum required pumping rate of 20 gpm, in a one or two extraction well scenario. Extraction well EW-1 has been operating at an average flow rate of approximately 36 gpm since system start-up to provide for a greater factor of safety and ensure the full width of the plume is captured. Extraction well EW-2 has been operating at an average flow rate of approximately 5 gpm since system start-up due to the elevated VOC concentrations present within this well. It should be noted that the maximum yield for EW-2 has been historically limited to a range of 5-7 gpm due to a high silty/clay component in the screened interval of this extraction well.
2. Extraction well EW-1 was set at approximately 37 gpm following replacement of the influent flow meters. Based on recommendations presented in the RSO Report the flow at extraction well EW-1 was reduced to approximately 30 gpm in February 2012.
3. As detailed above, it is assumed that extraction well EW-2 was operating at an average of 7 gpm during this time period.



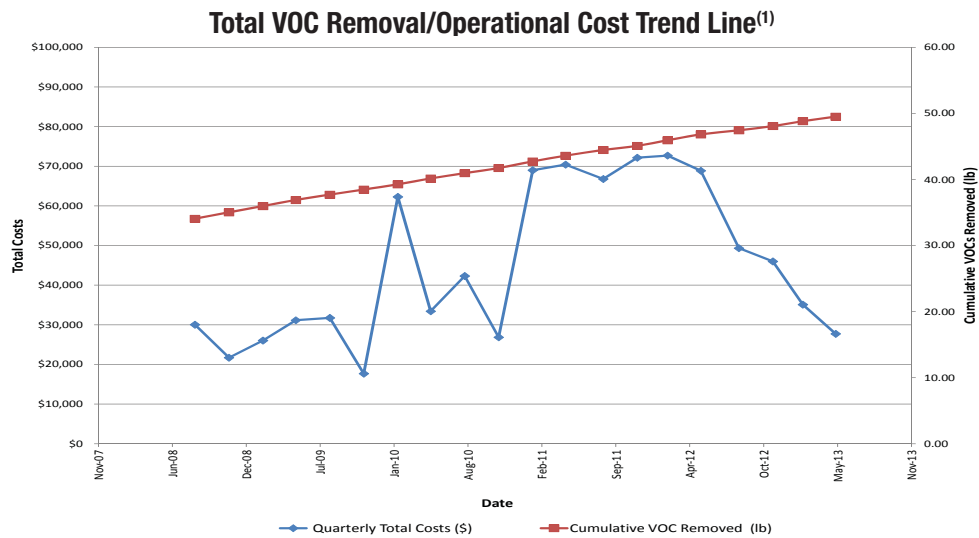
Treatment System Performance Summary (cont.)



Total VOC Removal Assessment	
VOC Removal - Current Reporting Period	0.69 lbs.
VOC Removal - Previous Reporting Period	0.74 lbs.
Average VOC Removal to Date (per period)	0.92 lbs.
Total VOC Removal to Date	49.5 lbs.

Total VOC Removal Costs ⁽³⁾	
VOC Removal Cost - Current Reporting Period	\$40,182 per lb.
VOC Removal Cost - Previous Reporting Period	\$47,428 per lb.
Average VOC Removal Cost to Date ⁽⁴⁾⁽⁵⁾	\$40,085 per lb.

1. The approximate PCE removal efficiency for the low-profile stacked-tray air stripper ranged from 99.56% to 99.63% during this reporting period. Additionally, it should be noted that the average differential pressure across the low-profile air stripper was well below 45 inches of water (manufacturer's recommended threshold for equipment maintenance) during this reporting period.
2. This change in the air stripper differential pressure is the result of the deletion of two air stripper trays from the modular air stripper on October 22, 2012, performed as recommended in the May 2012 RSO Report.
3. The VOC removal costs include monthly utility charges, maintenance costs and engineering costs. Capital construction costs and NYSDEC project management effort are not included in this evaluation. Due to the relatively high VOC removal costs, a RSO evaluation has been performed for the Franklin Cleaners Site in order to improve the efficiency and effectiveness of the GWE&TS, while at the same time, reducing the overall associated operating costs. A plume re-delineation program based on recommendations presented in the RSO is planned to be implemented in the near future.
4. Average calculated from system start-up (September 2004) through the previous reporting period.
5. Average VOC removal costs to date are based on more current cost information provided by the NYSDEC.



System Operation and Maintenance

Routine and non-routine system maintenance activities are discussed below. A table summarizing the required routine equipment maintenance, as well as a summary of the alarm conditions and associated system runtime/downtime for this reporting period, are summarized below. Refer to [Attachment B](#) for operation and maintenance logs, as prepared by NYSDEC “call out” contractor for this reporting period.

Routine maintenance of the wet well pumps, pressure blower, utility sink screen and wet well strainer were not completed as per the frequency specified in the Routine Equipment Maintenance Schedule shown below or the July 2012 SMP during this reporting period.



Routine Equipment Maintenance Schedule Summary

Major System Component	Manufacturer	Model Number	Maintenance Frequency	Maintenance Summary					
				Current Reporting Period			Next Reporting Period		
				Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13
Extraction Well Pumps	Grundfos Pump Corp.	Redi-Flo-4 Model 25E3	As needed based on flow trends						
Air Stripper	Carbonair	STAT Model 180	As needed based on differential pressure readings						
Pressure Blower	New York Blower Company	Model 2506A	Bi-Monthly	3/28/13		5/24/13*			
Vapor Carbon Vessels	Tetrasolv Filtration Inc.	Model VF-1000	As needed based on PID screening results						
Wet Well Pumps	Flygt Corporation	Model CP3085	Annual						
Sump Pump	Grundfos Pump Corp.	Model KP-350	As needed						
Flow Meter Vault Effluent Screen	--	--	Annually						
Wet Well Strainer	--	--	Annually						

 : Planned activity

*: Site activity log indicates maintenance was conducted on the pressure blower. According to the log, the blower belt was inspected; however, the log does not indicate that the pressure blower motor was greased.

Non-Routine System Maintenance:

An enclosure and line reactor for the pressure blower was installed on March 12, 2013.

General Facility Maintenance:

General facility maintenance was not conducted during this reporting period.

Alarm Conditions:

The following alarm conditions occurred during this reporting period:

- A low flow alarm condition occurred on May 7, 2013 and the system was restarted on the same day; and
- A low flow alarm condition occurred on May 25, 2013 and the system was restarted on May 29, 2013.



System Runtime/Downtime Summary

Runtime - Current Reporting Period ⁽¹⁾	2,194 hours	99.4%
Downtime - Current Reporting Period ⁽¹⁾	14 hours ⁽³⁾	0.6%
Total Runtime to Date ⁽²⁾	76,046 hours	90.6%
Total Downtime to Date	7,143 hours	9.4%

1. Total elapsed time for current reporting period, 2,208 hours (March 1, 2013 through May 31, 2013).

2. Based on a system start-up date of September 20, 2004.

3. Downtime for this reporting period is the result of the alarm condition discussed above and routine maintenance activities conducted during this reporting period.

System Monitoring and Sampling Results

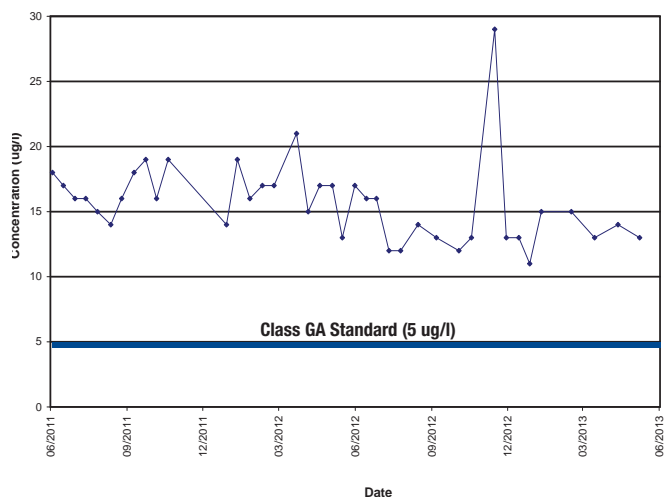
A summary of the pertinent routine system monitoring and sampling results are provided below. Refer to [Attachment C](#) for tabulated analytical results.

Extraction Wells - System Influent PCE Concentration Ranges/Averages ⁽¹⁾

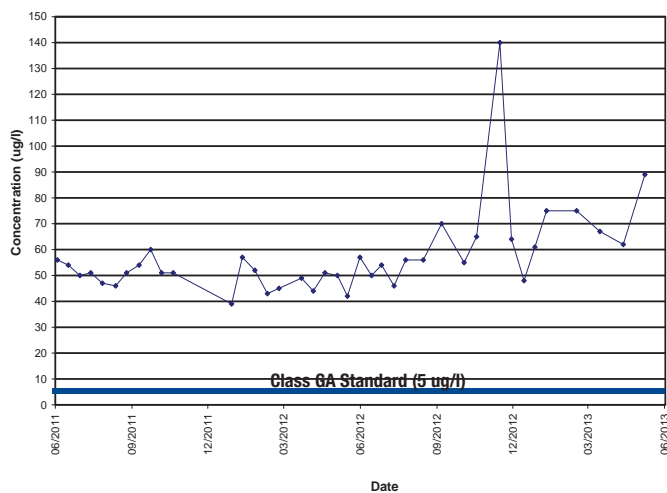
Sample Location	Current Reporting Period	Previous Reporting Period	Average to Date	Groundwater Standard
Extraction Well EW-1	13 ug/l - 14 ug/l	11 ug/l - 14 ug/l	18 ug/l	5.0 ug/l (Class GA)
Extraction Well EW-2	62 ug/l - 89 ug/l	48 ug/l - 75 ug/l	91 ug/l	5.0 ug/l (Class GA)

1. In addition to the PCE concentrations presented in this table, chloroform and trichloroethene were detected in one or more system influent sample; however, these compounds were detected at concentrations well below their respective Class GA Groundwater Standards.

Extraction Well EW-1 Influent PCE Concentration Trend Line



Extraction Well EW-2 Influent PCE Concentration Trend Line





Aqueous-Phase Air Stripper Effluent Concentration Ranges

Discharge Permit Parameters	Current Reporting Period	Previous Reporting Period	Site-Specific Effluent Limit
PCE	ND	ND	5.0 ug/l
TCE	ND	ND	10.0 ug/l
1,1-DCE	ND	ND	10.0 ug/l
Cis-1,2-DCE	ND	ND	10.0 ug/l
1,1,1-TCA	ND	ND	10.0 ug/l
Iron	145 - 318	90.9 - 1,630	1,000 ug/l
Manganese	12.3 - 15.7 ug/l	11.4 ug/l - 27 ug/l	1,000 ug/l
pH (Field Screening Results)	6.67 - 7.82	6.68 - 7.52	6.5 - 8.5

Notes:

ND: Constituent concentration below the analytical detection limit.
Site-specific effluent limits, per the SPDES permit equivalency.
Red font denotes an exceedance of the site-specific effluent limits.

Vapor-Phase Discharge

	System Vapor Discharge	Site-Specific Discharge Limit
Total VOC Concentrations (field screening with PID) ⁽¹⁾	0.0 - 4.4 ppm	NA
Total VOC Concentrations (laboratory analysis)	--	NA
Average Pressure Blower Flow Rate	649 cfm	NA
Maximum Total VOC Emissions ⁽²⁾	0.07 lbs/hr	0.5 lbs/hr ⁽³⁾

--: Not analyzed

NA: Not applicable

1. The PID screening is utilized as a means to instantaneously monitor total vapor-phase VOC discharge concentrations.
2. Total VOC emissions were calculated utilizing the "worst case scenario" data.
3. The site-specific effluent limit of 0.5 lbs/hr was developed in consultation with the NYSDEC as a means to monitor the vapor-phase VOCs discharged by the GWE&TS.

Groundwater Monitoring Summary

The network of groundwater monitoring wells was sampled to determine groundwater quality at, and in the vicinity of, the Site. Groundwater samples were collected from three groundwater monitoring wells located in close proximity to the leading edge of the Franklin Cleaners plume (ASMW-1 through ASMW-3), and four groundwater monitoring wells located downgradient of the leading edge of the plume (ASMW-4 through ASMW-6). Note that groundwater monitoring wells ASMW-4 through ASMW-7 act as early warning or "sentinel" wells for a cluster of Village of Rockville Centre public supply wells located downgradient of the treatment system building. The locations of the groundwater monitoring wells are depicted on [Figure 3](#).

As discussed in the previous Site Management Quarterly Reports, construction activities have been ongoing in the vicinity of ASMW-7. These construction activities included modification of ASMW-7 so that Molloy College may use this well for future irrigation purposes. Per the NYSDEC's request, Molloy College will install a valve within the ASMW-7 piping to allow for the continued routine collection of groundwater samples from this well. However, at the time of the routine groundwater sampling, the valve had not yet been installed at ASMW-7. As a result, a groundwater sample could not be collected from this well.



Groundwater Monitoring Well Condition Summary:

All of the sampled groundwater monitoring wells were found to be accessible during the groundwater monitoring/sampling events conducted on April 18, 2013 and April 19, 2013, with the exception of groundwater monitoring well ASMW-7, as discussed above. All of the groundwater monitoring wells were located as indicated on the site map and the concrete well pads (where applicable), protective casings, surface seals, well IDs, PVC well risers, well plugs and locks were observed to be present and in good condition; however, the well locks at groundwater monitoring wells ASMW-1 through ASMW-5 are not functional. Note that new locks were installed at groundwater monitoring wells ASMW-1 and ASMW-2 following the well condition survey/groundwater sampling event.

Field inspection logs for all groundwater monitoring wells assessed during this period are provided in [Attachment D](#).

Groundwater Monitoring Well Repairs:

Based on recommendations presented in the Site Management Quarterly Report Nos. 33 and 34, monitoring wells were repaired on May 24, 2013, as follows:

- The well IDs were replaced on all of the groundwater monitoring wells; and
- The well locks were replaced on groundwater monitoring wells ASMW-1 and ASMW-2. Note that these locks were installed following the well condition survey/groundwater sampling effort detailed above.

Groundwater Monitoring Results Summary:

A headspace reading was collected at each of the sampled groundwater monitoring wells immediately after the removal of the well caps utilizing a PID. VOCs were detected at concentrations ranging from non-detect to a maximum of 94.7 ppm, detected in monitoring well ASMW-6.

Below is a detailed summary of PCE concentrations in site groundwater. Refer to [Attachment C](#) for analytical data results.

Groundwater Monitoring Wells - PCE Concentrations								
	Treatment System Effectiveness Monitoring Wells			Sentinel Monitoring Wells				Class GA Groundwater Standard
Monitoring Well ⁽¹⁾	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6	ASMW-7	
Current Reporting Period	46 ug/l	1.3 ug/l	ND	ND	ND	ND	--	5.0 ug/l
Previous Reporting Period	31 ug/l	0.77 ug/l	--	ND	--	--	--	5.0 ug/l
2-Year PCE Trend Analysis ⁽²⁾	Increasing	Decreasing	Stable	Stable	Stable	Stable	Stable	

ND: Constituent concentration below the analytical detection limit.

--: Not sampled.

Red font denotes an exceedance of the Class GA Groundwater Standard.

In addition to PCE, the following containments were detected below their respective Class GA standards in groundwater monitoring well ASMW-1 during this reporting period: chloroform, 1,1,1-trichloroethane and 1,1-dichloroethene.

1. Click on monitoring well IDs with blue text for graphs depicting PCE concentrations over the last 2 years in wells exhibiting exceedances of the Class GA Groundwater Standard for this and the previous reporting period.

2. Trend analysis is calculated on an increase or decrease of 5.0 ug/l over a 2-year time frame.

A figure depicting the current PCE concentrations in groundwater is provided as [Figure 4](#). In comparison with the previous reporting period, PCE concentrations have increased in groundwater monitoring well ASMW-1 and have remained stable in groundwater monitoring wells ASMW-3 through ASMW-7. Although downgradient "sentinel" monitoring well ASMW-7 was



not sampled during this reporting period, PCE concentrations have historically remained non-detect in this well.

Note that, groundwater contaminant data is limited to the west and south of ASMW-1 and the treatment system building, as the current monitoring well network does not include wells in these areas.

Data Validation:

No qualification of the data was necessary based on D&B's review. Data Validation Checklists are presented in [Attachment E](#).

All analytical data associated with the Franklin Cleaners GWE&TS project have been submitted to the NYSDEC in the required EQulS format and within 30 days of receipt of the data from the NYSDEC "call-out" contractor.

Findings and Recommendations

Findings:

- Extraction Well Flow: The analytical results of the system influent samples demonstrate that groundwater extraction wells EW-1 and EW-2 continue to capture VOC-contaminated groundwater. Extraction well EW-1 operated at an average flow rate of 27.9 gpm throughout this reporting period and extraction well EW-2 operated at an average flow rate of 6.4 gpm throughout this reporting period;
- Treatment System Runtime: The treatment system was operational for approximately 99.4% of this reporting period (approximately 2,194 hours);
- GWE&TS Routine Maintenance: A portion of the required blower motor maintenance (blower motor greasing) was not completed per the requirements of the routine maintenance schedule;
- Air Stripper: The air stripper continues to operate efficiently and within its design specifications;
- Air Stripper Discharge Parameters (Aqueous-phase): All aqueous-phase discharge analytes were detected at concentrations below their respective site-specific effluent limits;
- Air Stripper Discharge Parameters (Vapor-phase): The vapor-phase discharge piping outlet exhibited total VOCs ranging from non-detect to 4.4 ppm, as detected utilizing a PID. Total VOC concentrations were detected well below the site-specific total VOC effluent limit of 0.5 lbs/hr;
- Groundwater Monitoring Well Inspection/Sampling Summary:
 - Monitoring Well Conditions: All of the sampled groundwater monitoring wells had visible well IDs and were sealed at the surface and competent; however, the well locks need to be replaced at groundwater monitoring wells ASMW-3 through ASMW-5;
 - Monitoring Well PCE Exceedances: Concentrations of PCE detected in groundwater monitoring well ASMW-1 exceeded the Class GA Standard of 5.0 ug/l, at a concentration of 46 ug/l, and has exhibited an increasing trend over the last three sampling events. However, note that PCE was not non-detected in this well during the September 2012 sampling event and has fluctuated between non-detected and 46 ug/l over the last three sampling events.

Recommendations:

- General Treatment System: Continue operation of the GWE&TS;
- Routine Maintenance of the GWE&TS: In order to reduce the likelihood of premature equipment failure and associated system downtime, D&B recommends that the NYSDEC "call-out" contractor perform maintenance of the pressure blower and wet well pumps, and all other system components, in accordance with their respective manufacturer's specifications and per the requirements of the October 2003 O&M Plan. In addition, the NYSDEC "call-out" contractor did not complete the routine maintenance and cleaning of the pressure blower as per the July 2012 SMP;
- Monitoring Well PCE Exceedances: Based on the wide fluctuations in PCE concentrations detected in monitoring well ASMW-1 over the last several sampling events, it is recommended that the NYSDEC verify that proper and consistent



sampling procedures are being utilized to sample ASMW-1 and other monitoring wells. In addition, D&B will closely monitor PCE concentrations within this well in the upcoming groundwater sampling events;

- RSO Evaluation: A RSO evaluation of the GWE&TS has been completed in order to improve the efficiency, effectiveness and net environmental benefit of the GWE&TS which included several recommendations for plume re-delineation, as well as the monitoring well repairs and resurvey recommendations discussed below:
 - Groundwater Plume Re-delineation: Based on the historic PCE concentrations detected in groundwater monitoring well ASMW-1, D&B will re-delineate the groundwater plume via installing and sampling several temporary geoprobe probes along the leading edge, length and up/side gradient areas of the plume to more accurately define its current location and extent. Based on the results of the plume re-delineation, it may be warranted to install additional permanent monitoring wells, modify the current extraction well configuration and/or implement an alternate remedial approach at the Site in order to optimize and accelerate the recovery and treatment of the entire groundwater plume. D&B will provide a plume re-delineation scope of work for review and approval in the near future.
 - Groundwater Monitoring Well Repairs: Based on the recommendations presented in the May 2012 RSO Report, the following items have not yet been addressed and should be repaired:
 1. Re-survey any wells where the casing elevation has changed as a result of the completed well repair activities; and
 2. Ensure that Molloy College installs a valve within the ASMW-7 piping to allow for the continued routine collection of groundwater samples from this well.
 - In addition, based on the damage previously noted at monitoring wells ASMW-4 through ASMW-7, D&B recommends that the total depths of each monitoring well be evaluated in order to ensure debris has not entered these wells. Based on the results of this evaluation, it may be warranted to re-develop or re-condition some or all of these monitoring wells.

Reclassification/Delisting Evaluation

The Site was originally listed as a Class 2 Inactive Hazardous Waste Site by the NYSDEC on June 17, 1993. Since this time, completion of the following project phases has occurred, as summarized below:

<i>Project Phases and Completion Dates</i>	
<i>Project Phase</i>	<i>Completion Date</i>
Remedial Investigation	03/1998
Remedial Design	02/2001
Groundwater Extraction and Treatment System Construction	07/2003 ⁽²⁾
Remedial Action (Source Area Remediation)	03/2007 ⁽¹⁾

1. Source area contaminated soil and groundwater were remediated with the Air Sparge/Soil Vapor Extraction (AS/SVE) system beginning in September 2003. The on-site AS/SVE system has successfully removed the contaminants from the vadose zone and greatly diminished groundwater contaminants to below detectable limits. Although confirmation soil samples met the required remedial goals, a subslab depressurization system replaced the on-site AS/SVE system in 2006 due to the detection of elevated vapor phase VOC concentrations in the basement level and below the basement floor slab.
2. Construction of the GWE&TS was completed in July 2003. The GWE&TS was placed into routine operation in September 2004 and currently continues to meet remedial objectives as originally designed.

Given the above, NYSDEC reclassified the Franklin Cleaners GWE&TS Site on December 11, 2012, pursuant to the requirements identified in 6 NYCRR §375-2.7, as a Class 4 Site since the NYSDEC determined that the site no longer presents a significant threat to public health and/or the environment based on remedial efforts performed to date and implementation of the July 2012 Site Management Plan (SMP). In addition, the NYSDEC has implemented a post-remedial



**NYSDEC Site No. 130050, Franklin Cleaners Site
Groundwater Extraction and Treatment System**

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indoor air study within the source area structures/buildings to verify current site conditions. Site delisting is not feasible at this time, as all remediation and post-remediation activities have not been satisfactorily completed.

Report Certification:

I have personally examined and am familiar with the information submitted in the referenced report. To the best of my knowledge and belief, and based upon my inquiry of those individuals immediately responsible for obtaining the information reported therein, I certify that the submitted information is true, accurate, and complete.

Project Director:

Richard M. Walka
Senior Vice President

7.29.13

Date

Project Manager:

Stephen E. Tauss
Geologist II

7/29/13

Date